

In the Claims

Claim 1 (original) A molten metal pump system comprising:
a pump framework;
a pump motor mounted on the pump framework;
a pump base attached to the pump framework, the pump base including an
impeller aperture with interior walls;
an impeller shaft attached to the pump motor;
an impeller body attached to the impeller shaft and at least partially within
the impeller aperture in the pump base, the impeller body comprising:
a center portion with a shaft aperture therein;
a plurality of vanes extending outward from the center portion, each
vane including a radially outward end, an input side, and an
output side; and
wherein a particle relief passageway is defined between the radially outward
end of the plurality of vanes on the impeller and the interior walls of
the impeller aperture, the particle relief passageway being a
predetermined size to allow particles of a predetermined size to pass
between the plurality of vanes and the interior walls of the impeller
aperture of the pump base.

Claim 2 (original) A molten metal pump system as recited in claim 1, and
further wherein the impeller body is wholly within the impeller aperture
in the pump base.

Claim 3 (original) A molten metal pump system comprising:

a pump framework;

a pump motor mounted on the pump framework;

a pump base attached to the pump framework, the pump base including an impeller aperture with interior walls;

an impeller shaft attached to the pump motor;

an impeller body attached to the impeller shaft and at least partially within the impeller aperture in the pump base, the impeller body comprising:

a center portion with a shaft aperture therein;

a plurality of vanes extending outward from the center portion, each vane including a radially inward end, a radially outward end, an input side, an output side, a leading surface, a trailing surface, a vane width between the leading surface and the trailing surface; the plurality of vanes being tapered at the input side from the radially inward end to the radially outward end, thereby creating a shoulder on the radially outward end of the plurality of vanes;

and

wherein a predetermined particle relief passageway is defined between the plurality of vanes on the impeller, the predetermined partial relief passageway being sized to allow particles of a predetermined size to pass between the plurality of vanes and the interior walls of the impeller aperture of the pump base.

Claim 4 (original) A molten metal pump system as recited in claim 3, and further wherein the impeller body is wholly within the impeller aperture in the pump base.

Claim 5 (new) A molten metal pump impeller system comprising: an impeller body comprising:

a center portion with a shaft aperture therein;

a plurality of vanes extending outward from the center portion, each vane including a radially inward end, a radially outward end, an input side, an output side, a leading surface, a trailing surface, a vane width between the leading surface and the trailing surface; and

wherein the vane width is tapered from the input side to the output side.

Claim 6 (new) A molten metal pump impeller system as recited in claim 5, and further comprising an annular base at the output side of the plurality of vanes.

Claim 7 (new) A molten metal pump impeller system as recited in claim 6, and further wherein the entire vane width is tapered from the input side to the annular base.

Claim 8 (new) A molten metal pump impeller system as recited in claim 5, and further wherein the input side is the vertically upward side.

Claim 9 (new) A molten metal pump impeller system as recited in claim 5, and further wherein the plurality of vanes are tapered at the input side from the radially inward end to the radially outward end, thereby creating a shoulder on the radially outward end of the plurality of vanes.

Claim 10 (new) A molten metal pump impeller system as recited in claim 5, and further wherein the leading surface is convex.

Claim 11 (new) A molten metal pump impeller system comprising:
an impeller body comprising:
a center portion with a shaft aperture therein;
a plurality of vanes extending outward from the center portion, each vane including a radially inward end, a radially outward end, an input side, an output side, a leading surface, a trailing surface, a vane width between the leading surface and the trailing surface;
and
wherein the leading surface is convex.

Claim 12 (new) A molten metal pump impeller system as recited in claim 11, and further comprising an annular base at the output side of the plurality of vanes.

Claim 13 (new) A molten metal pump impeller system as recited in claim 12, and further wherein the entire vane width is tapered from the input side to the annular base.

Claim 14 (new) A molten metal pump impeller system as recited in claim 11, and further wherein the input side is the vertically upward side.

Claim 15 (new) A molten metal pump impeller system as recited in claim 11, and further wherein the plurality of vanes are tapered at the input side from the radially inward end to the radially outward end, thereby creating a shoulder on the radially outward end of the plurality of vanes.

